REMARKS

Claims 1-31 are pending, with claims 1, 2, 5, 7, 15, 18, 19, 20, 26, 27, 29, and 31 being independent. Claims 22 and 31 have been cancelled by this amendment without prejudice. Claims 1, 15, and 26 have been amended. New claim 32 has been added. No new matter has been added. Reconsideration and allowance of the above-referenced application are respectfully requested.

Claims 2, 3, 5-7, and 20 have been allowed. Claims 8, 10-14, 22, and 23 have been indicated as allowable. The indication of allowable subject matter is acknowledged and appreciated. These claims are retained.

Claims 1, 4, 9, 15-19, 21, and 24-31 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Nishino et al. (3D Object Modeling Using Spatial and Pictographic Gestures). This contention is respectfully traversed.

Nishino describes a system that interprets gestures to control preprogrammed shapes. For example, figure 11 of Nishino shows how preprogrammed shapes (i.e., shape primitives) can be combined and deformed to create a composite shape. "As the figure shows, [objects] are produced by combining the three operations (primitive shape creation, blending and deformation) in a quite straightforward manner." (*See* Nishino at page 56, col. 2, lines 3-9.) Thus, Nishino describes a 3D modeling

process that starts with one or more primitive shapes, which are then combined and deformed as desired.

In contrast, the present application describes a modeling process in which multiple individual shapes are defined by hand movements (in a virtual reality environment) at each of a plurality of intervals, and these individual shapes are added to the three-dimensional modeled surface being formed. Thus, a complex surface can be formed by a series of individual strokes, which are summed together to form a surface in a manner that may be considered analogous to the way pencil lines come together on a page to form a drawing.

Some of the advantages of this approach are described in the specification as follows:

> Surface Drawing uses motions of the human hand to describe shapes. As the hand is moved in a semi-immersive environment, a surface is grown by adding the shape defined by the hand movement at each sampling interval. The versatility and natural understanding of the hand, combined with the simplicity of this process, allows for an intuitive modeling process in which the user can think perceptually about a shape while constructing the shape. While the resulting surface might not meet certain analytic criteria, such as curvature continuity, forms can be constructed with gestural, emotive qualities that are difficult to achieve with traditional surface modeling tools. This system has

> both the ease of use that novices expect and the control that experts demand. These tools support conceptual design and the artistic process. These methods are distinct from those focusing on exact specification of geometry, as needed in traditional CAD.

(*See* the present specification at page 4, lines 3-19.) Nishino does not, in any way, teach or suggest this subject matter.

Independent claim 1 recites, "forming a three-dimensional modeled surface by adding shapes defined by hand movements at each of a plurality of intervals." The Official Action acknowledges that Nishino does not teach a shape adding operation performed "at each of a plurality of intervals", but then goes on to suggest that this would have been obvious because "the order arrangement of operations in time intervals improves the realistic procedure of shaping an object and enhances the designing in a natural and intuitive manner." This argument is improper hindsight analysis and fails to meet the Patent Office's initial burden of establishing a prima facie case of obviousness.

A prima facie case of obvious has not been established because (1) an element of the claim has not been found in the cited art and (2) the suggested motivation to create this element has not been identified in the cited art or in the knowledge generally available to one of ordinary skill in the

art. Moreover, the Official Action disregards the relationship between the language "at each of a plurality of intervals" and the language that comes before it in the claim. Even if it were obvious to perform the shaping operations of Nishino at each of a plurality of intervals, this does not render obvious the claimed subject matter of "forming a three-dimensional modeled surface by adding shapes defined by hand movements at each of a plurality of intervals." (Emphasis added.)

Thus, independent claim 1 should be in condition for allowance even before this amendment. Nonetheless, claim 1 has been amended to clarify the claimed subject matter in an effort to advance prosecution. As amended, claim 1 now further recites, "an added shape comprises a surface region formed from sampled positions of a hand movement in the virtual reality environment during an interval." Claim 1 is now in condition for allowance. Dependent claims 4 and 9 are patentable for at least the above reasons.

Independent claim 15 has been amended to include the feature of allowable claim 22, which has been cancelled. Thus, independent claim 15 should now be in condition for allowance. Dependent claims 16, 17, 21, 24, and 25 are patentable based on their dependence from claim 15 and based on additional recitations they contain.

With respect to independent claim 18, the Official Action acknowledges that Nishino does not teach "wherein said forming comprises using the hand to create 3d-strokes of shape; further comprising displaying a trace of the path of the hand, sensing at least 7 of the hand's degrees of freedom for the purposes of shape creation, said degrees of freedom including the hand's position and orientation in space, along with degrees of freedom that are affected by the hand's posture." The Official Action then goes on to suggest that all of these claimed features would have been obvious because "such claimed hand gestures provides the gesture based interface to improve the interface between the user and the system in a natural and intuitive manner and enhances the computer operations." This argument is improper hindsight analysis and fails to satisfy the three basic criteria that must be met to establish a prima facie case of obviousness. (*See* MPEP §§ 706.02(j); 2142; and 2143-2143.03.) Particular attention is called to the fact that nothing in Nishino even remotely teaches or suggest "using the hand to create 3d-strokes of shape." (Emphasis added.)

Independent claim 19 also includes "forming a three-dimensional modeled surface based on said position of said user's hand at different times; wherein said forming comprises using the hand to create 3d-strokes of shape." (Emphasis added.) The Official Action cites page 55, col. 1, lines 37-39

of Nishino as teaching 3d-strokes of shape, but this cannot be supported. This portion of Nishino describes how a 3D modeler can refer to the output of a dynamic gesture recognizer (DGR) "to find the object shape to create or deform when the users' both hands are in the 'deform' posture." (Emphasis added.) This is clearly describing the use of hand gestures to identify a type of shape primitive to create, or to identify an existing shape primitive to deform.

This does not in any way teach or suggest using the hand to create 3d-strokes of shape. The language of claims 18 and 19 clearly indicates that the hand stroke itself forms the 3D shape of the model. In contrast, Nishino describes a hand gesture that indicates a desired shape from a set of primitives, but does not in itself form the shape. This is made abundantly clear when Nishino describes how its shapes are created in connection with figure 3:

> Shapes and movement patterns of the users' both hands indicate the required modifications to form the shape. They are (a) drawing "ellipsoid" by both hands to get primitive shapes, (b) grasping and blending them and (c) squaring and tapering the blended shape to make the "construction" followed by twisting to get the target shape. While these gestures are selected to be intuitive actions, the users are allowed to choose and set different gestures for these modeling

operations. This is an important idea to deal with the ambiguity and diversity of human gestures.

(*See* Nishino at page 53, col. 1, line 27 to col. 2, line 4; emphasis added.) This is clearly very different from the presently claimed subject matter in which an object can be formed directly from multiple, small hand strokes that form 3d-strokes of shape, which compose the object.

In view of this clarification of Nishino, it should now be clear that Nishino fails to teach or suggest forming a three-dimensional modeled surface based on said position of said user's hand at different times; wherein said forming comprises using the hand to create 3d-strokes of shape. For all of the above reasons, independent claims 18 and 19 should be in condition for allowance.

Independent claim 26 has been amended to recite, "wherein the added shapes comprise surface meshes including vertices placed in a three-dimensional space of the virtual reality environment according to the tracked hand shapes". In view the above remarks, and this amendment, claims 26 should now be in condition for allowance. New claim 32 depends from claim 26 and specifies that each of the surface meshes can include a mesh of triangles. New claim 32 should also be in condition for allowance.

With respect to independent claim 27, the Official Action acknowledges that Nishino does not teach "a processing element which incrementally adds surface regions to an extant surface." The Official Action then goes on to suggest that it would have been obvious to perform the operations incrementally because "incremental arrangement of operations in time intervals improves the realistic procedure of shaping an object and enhances the designing in a natural and intuitive manner." Again, this is improper hindsight analysis and is not supported by the cited art. The blending of primitives taught by Nishino cannot be equated with the claimed incremental addition of surface regions to an extant surface. Thus, a prima facie case of obviousness has not been established, and for at least this reason, claims 27 and 28 should be in condition for allowance.

With respect to independent claim 29, the Official Action acknowledges that Nishino does not teach "using said new shape to apply deformations to said first shape; and displaying said first shape as deformed by said new shape." The Official Action then suggests a motivation to create these claimed features, without citing a reference or taking official notice. Thus, this rejection fails to satisfy the three basic criteria that must be met to establish a prima facie case of obviousness. For at least this reason, claims 29 and 30 should be in condition for allowance.

With respect to each of independent claims 1, 15, 18, 19, 26, 27, and 29, attention is called to *In re Lee*, 277 F.3d 1338 (Fed. Cir. 2002), in which the Federal Circuit vacated a Patent Office Board affirmance of an obviousness rejection because, rather than relying on objective evidence, the Patent Office based its obviousness rejection on conclusory statements having no evidentiary support in the record. *Id.* at 1342-43. In doing so, the Federal Circuit made it abundantly clear that "subjective belief and unknown authority" and "[assertions of] common knowledge and common sense" are not "a substitute for evidence." *Id.* at 1343-44.

It is respectfully suggested for all of these reasons, that the current rejections are overcome, that none of the cited art teaches or suggests the features which are claimed, and therefore that all of these claims should be in condition for allowance.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific issue or comment does not signify agreement with or concession of that issue or comment. Because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as

specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

In view of the above amendments and remarks, therefore, a formal notice of allowance is respectfully requested.

Please apply any necessary charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

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